

GPM MISSION OVERVIEW

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Abstract

The Global Precipitation Measurement (GPM) Mission is an international satellite mission to unify and advance precipitation measurements from a constellation of research and operational sensors to provide “next-generation” precipitation products. Relative to current global rainfall products, GPM data products will be characterized by: (1) more accurate instantaneous precipitation measurements (especially for light rain and cold-season solid/snow precipitation), (2) more frequent sampling by an expanded constellation of microwave radiometers that include operational humidity sounders over land, (3) inter-calibrated microwave brightness temperatures from constellation radiometers within a unified framework, and (4) physical-based precipitation retrievals from constellation radiometers using a common *a priori* cloud/hydrometeor database derived from GPM Core sensor measurements.

The cornerstone of the GPM mission is the deployment of a Core Observatory in a unique 65° non-Sun-synchronous orbit to serve as a physics observatory and a calibration reference to improve precipitation measurements by a constellation of dedicated and operational passive microwave sensors. The Core Observatory will carry a Ku/Ka-band Dual-frequency Precipitation Radar (DPR) and a multi-channel (10-183 GHz) GPM Microwave Radiometer (GMI). The combined use of DPR and GMI measurements will place greater constraints on possible solutions to radiometer retrievals to improve the accuracy and consistency of precipitation retrievals from all constellation radiometers.

As a science mission with integrated application goals, GPM is designed to (1) advance precipitation measurement capability from space through combined use of active and passive microwave sensors, (2) advance the knowledge of the global water/energy cycle and freshwater availability through better description of the space-time variability of global precipitation, and (3) improve weather, climate, and hydrological prediction capabilities through more accurate and frequent measurements of instantaneous precipitation rates and time-integrated rainfall accumulation.

An overview of the GPM mission concept and science activities in the United States, together with an update on international collaborations in radiometer intercalibration and ground validation, will be presented.